

Montana Driver Education and Training

Strategies for Managing Time and Space



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M6 - 1
April 2006

Standards and Benchmarks

1. Laws and Highway System

- c. consistently demonstrate knowledge and understanding by responsible adherence to highway transportation system traffic laws and control devices

2. Responsibility

- a. recognize the importance of making safe and responsible decisions for owning and operating a vehicle
- b. demonstrate the ability to make appropriate decisions while operating a motor vehicle
- c. consistently display respect for other users of the highway transportation system
- d. develop habits and attitudes with regard to responsible driving

3. Visual Skills

- a. know proper visual skills for operating a motor vehicle
- b. communicate and explain proper visual skills for operating a motor vehicle
- c. demonstrate the use of proper visual skills for operating a motor vehicle
- d. develop habits and attitudes with regard to proper visual skills

4. Vehicle Control

- a. demonstrate smooth, safe and efficient operation of a motor vehicle
- b. develop habits and attitudes relative to safe, efficient and smooth vehicle operation.

5. Communication

- a. consistently communicate their driving intentions (i.e., use of lights, vehicle and personal signals)
- b. adjust their driver behavior based on observation of highway transportation system and other users
- c. adjust communication (i.e., use of lights, vehicle and personal signals) based on observation of highway transportation system and other users
- d. develop habits and attitudes relative to effective communication

6. Risk Management

- a. understand driver risk-management principles
- b. demonstrate driver risk-management strategies
- c. develop driver risk-management habits and attitudes



Introduction to Space Management Systems

A space management system is a way to organize information into meaningful categories so drivers can easily and quickly make good decisions



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SIPDE

- S Search** at 20-30 seconds ahead for information to help plan the best path of travel
- I Identify** objects or conditions that could threaten the intended path of travel
- P Predict** what threats or changes in conditions could increase/decrease threat
- D Decide** what speed control and/or lane position action would reduce the threat
- E Execute** your decision with appropriate communication, speed and/or position adjustment



IPDE

- I Identify** a potential or critical hazard
- P Predict** how the potential or immediate hazard might affect your intended path of travel
- D Decide** on a maneuver to minimize, separate, or compromise to reduce the hazard
- E Execute** your decision by controlling speed, steering and/or communicating your actions



SAFE

- S Scan** to gather as much information from the driving scene around the vehicle
- A Assess** potential threats in the driving environment
- F Find** a way out of the situation
- E Execute** the decision to avoid upcoming conflict by changing speed and/or changing direction



ABCs of Zone Control

- A Alert** switch is turned on by seeing a Line-of-Sight or Path-of-Travel zone change
- B Before** acting, check the other zones
- C Create** time and space management by getting the best speed, lane position, and communication



SMITH SYSTEM

Aim High in steering to allow more time for driver response

Keep your eyes moving to search for hazards and vehicle movement around the vehicle

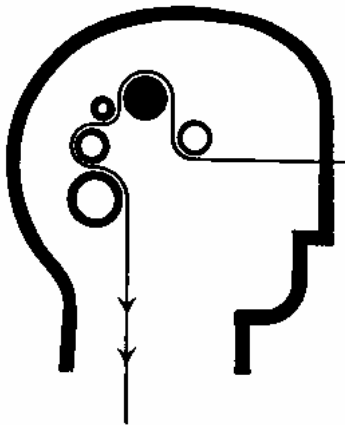
Get the big picture of where your vehicle is located in time and space

Make sure others see you by using appropriate communication, lane position, and visibility

Leave yourself an out to reduce risk of collision from the front, sides or rear



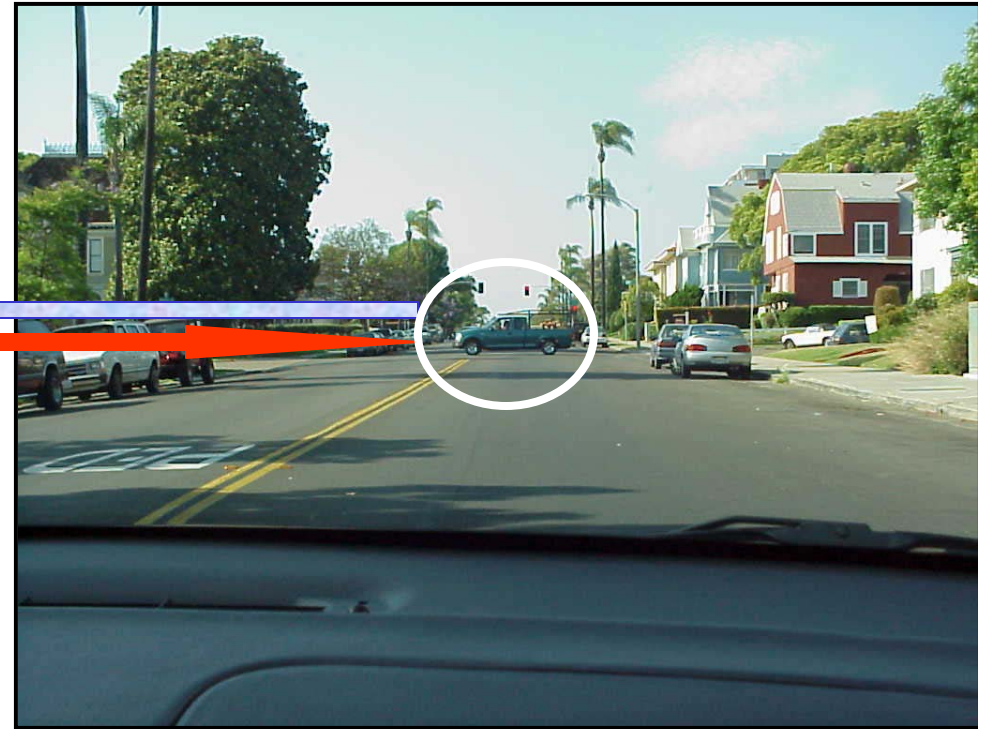
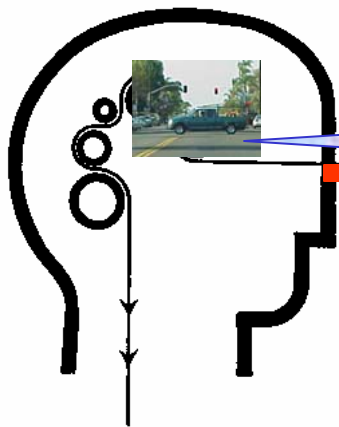
The Perceptual Process



- **Perception** is a brain activity that gives meaning to what we see
- Humans use different senses to develop **perceptual abilities**



VISION

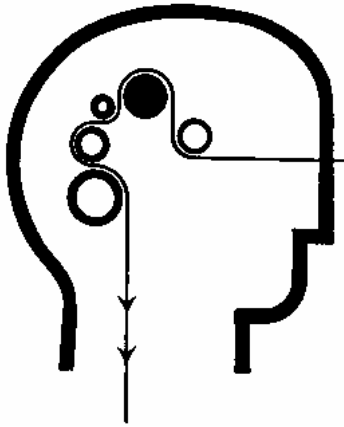


Vision is the primary input
(75-90%) to the brain



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MOTION

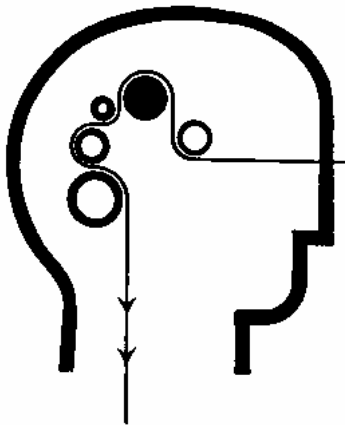


The feeling of **Motion** (the vehicle pitches forward or backward, or goes into a skid) helps us determine speed and steering adjustments

Motion is the second most important perceptual input



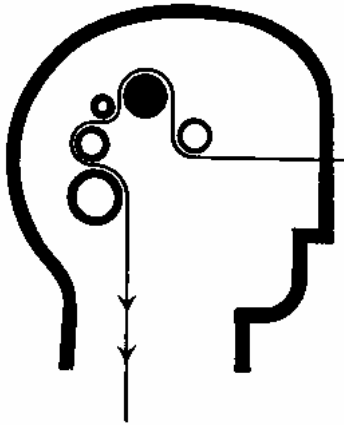
Other Senses Used in the Perceptual Process While Driving



- **Auditory** – warning from other drivers, tires squealing, engine noise, etc.
- **Touching** – feedback from the accelerator, brake, steering wheel
- **Smelling** – vehicle problems, potential emergencies



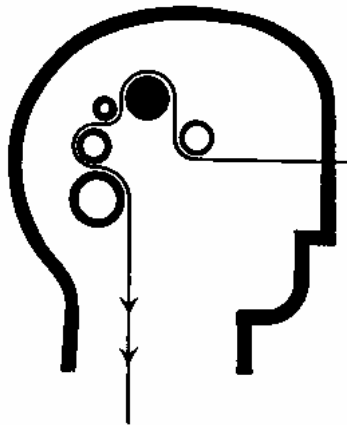
The Perceptual Process



- Driver perception is a learned process
- Which inputs are critical and which ones can be ignored?
- How will space management help us with our perceptual needs?



The Role of Experience



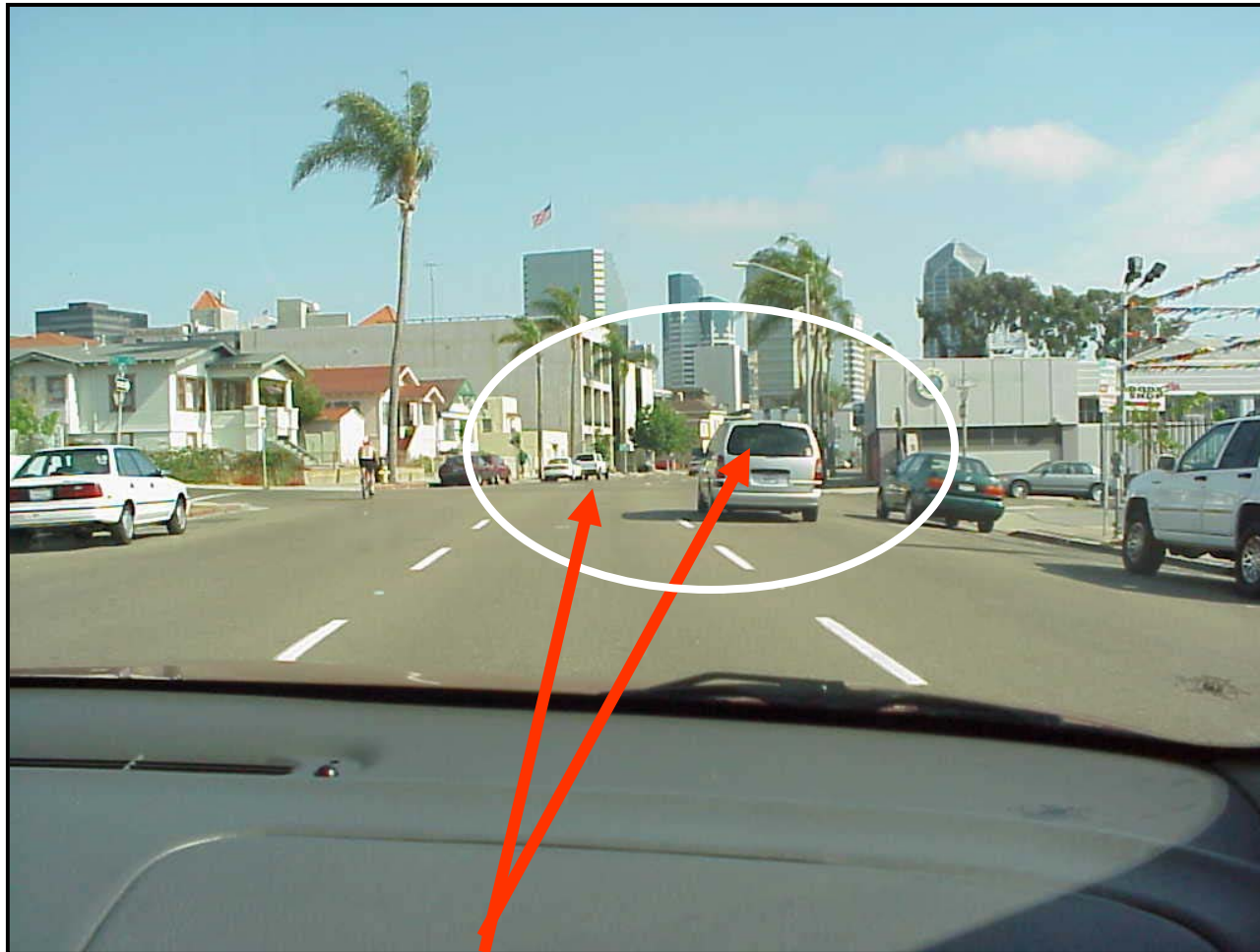
- How does observation of other driver's behaviors affect new drivers?
- What high-risk behaviors may already be in development in the new drivers as a result of watching experienced drivers?



Managing Time and Space Around the Vehicle



Line-of-Sight Restrictions



Path-of-Travel



Path-of-Travel Restrictions



Managing Time and Space Around Your Vehicle

USE AN ORDERLY VISUAL SEARCH PATTERN

- Know where, when, how, and what to look for
- Know how to evaluate potential problems – is it a high risk or reduced risk?



Managing Time and Space Around Your Vehicle

WHERE TO SEARCH

- **Move the eyes!**
- **Search close (dashboard and mirrors)**
- **Search at least 20-30 seconds ahead of the vehicle**



Managing Time and Space Around Your Vehicle

WHEN TO SEARCH

- Requires timing and direction of the search
- Consciously look to determine conditions all around the vehicle before initiating any maneuver



Managing Time and Space Around Your Vehicle

HOW TO SEARCH

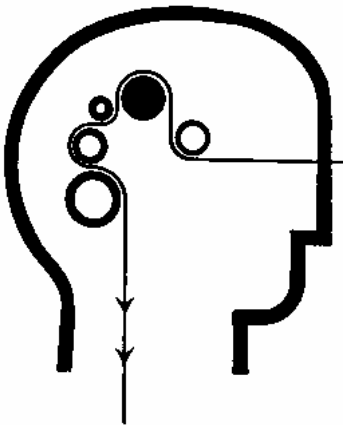
Use a systematic pattern of searching:

- **20-30 seconds ahead**
- **12-15 seconds ahead**
- **4-6 seconds ahead**
- **Search to the sides**
- **Search behind**
- **Search blind spots**



Managing Time and Space Around our Vehicle

WHAT TO SEARCH FOR



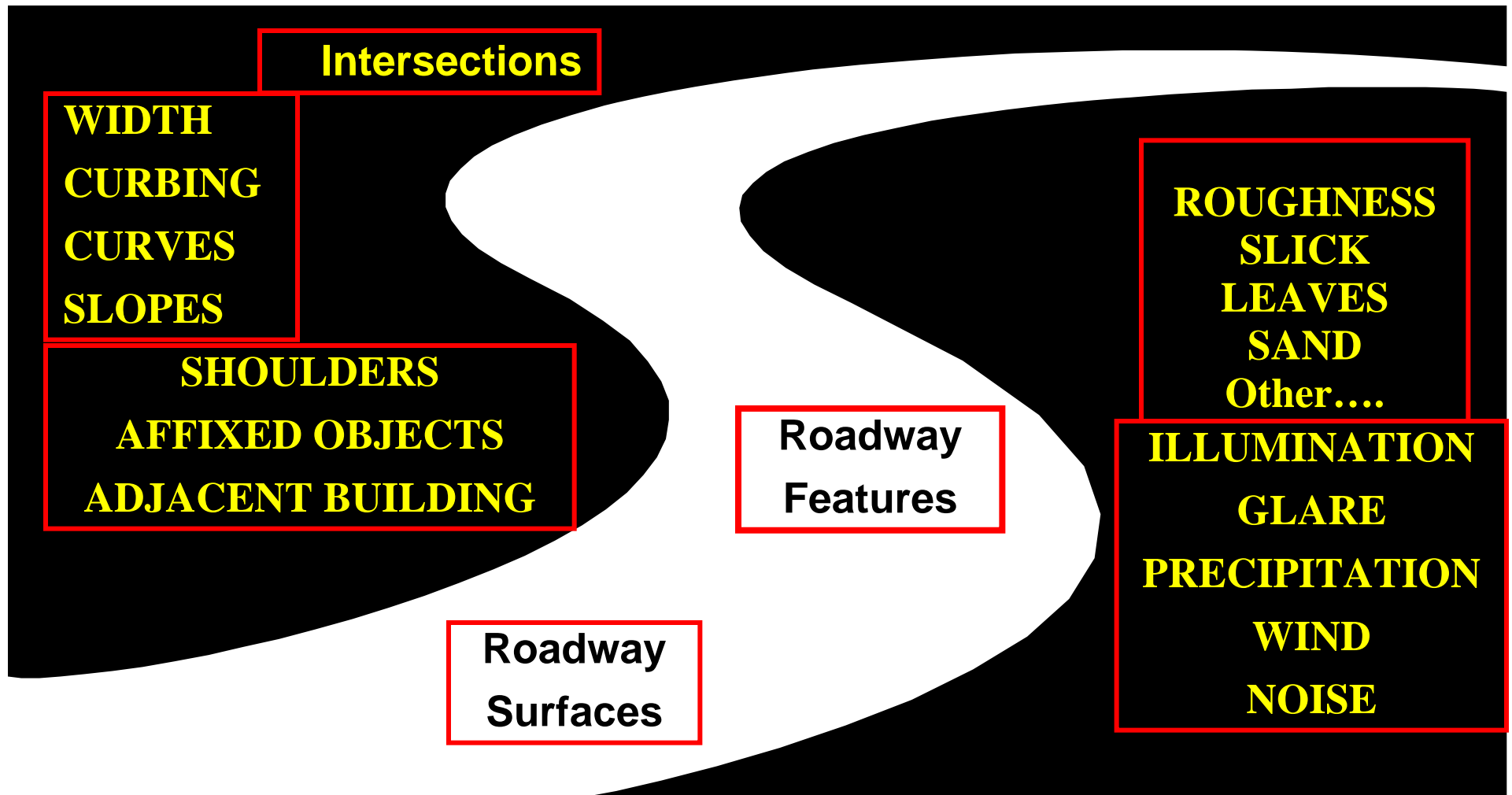
**Search for specific information to
program the brain with the eyes**

- 1. Roadway Features**
- 2. Signs/Signals/Markings**
- 3. Motorized Vehicles**
- 4. Non-Motorized Highway Users**



Visual Search Categories

Roadway Features



Visual Search Categories

Signs/Signals/Markings

LANE, TURNS,
PASSING,
CROSSWALK,
STOP LINE

Interchanges

Speed
Limit

Signs
REGULATORY
WARNING
GUIDE

Roadway
Markings

Unmarked
Intersections

Signals

Visual Search Categories

Motorized Vehicles

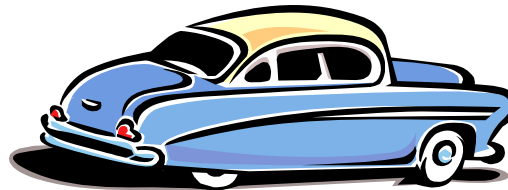
VAN, PICKUP,
3/4 TON, 1/2 TON,
TRACTOR
TRAILER, DOUBLE
BOTTOM, TRIPLE
BOTTOM, BUSES



CAMPER, PICKUP,
MOTOR HOMES,
MOTORCYCLES,
MOPEDS, OFF-
ROAD, FARM
EQUIP



SUSPENSION, TIRES,
BRAKING,
ACCELERATION,
SPEED, LOAD
DISTRIBUTION



SUBCOMPACT,
COMPACT,
INTERMEDIATE,
FULL-SIZE,
SPECIALTY



Visual Search Categories

NON-MOTORIZED USERS

Bicycles

- KIND AND SIZE
- QUANTITY
- RIDER ABILITY



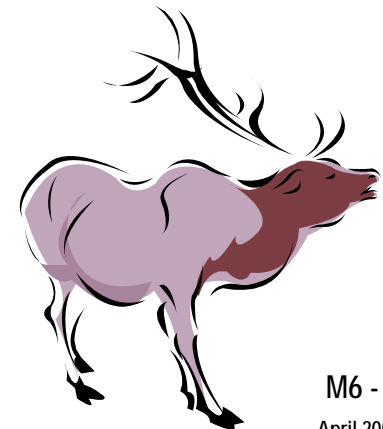
Pedestrians

QUANTITY, AGE,
ABILITY, ALCOHOL,
OTHER DRUGS,
FATIGUE,
EMOTIONS,
FITNESS, ACTIVITY



Animals

- KIND AND SIZE
- DOMESTIC
- WILD



LANE POSITION REVIEW

LANE POSITION 1

In the center of the lane.

Allows 3 feet on each side.

LANE POSITION 2

0-6 inches from a line to the left.

- Used for left turns, parking on the left, and to increase your line of sight.

LANE POSITION 3

0-6 inches from a line to the right.

- Used for parking, and to increase your line of sight.

LANE POSITION 4

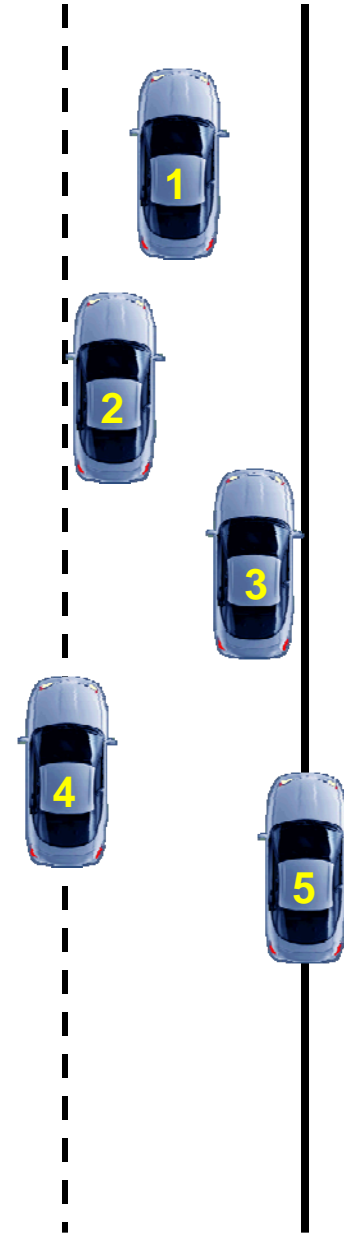
Straddling a line

- Used to move away from a hazard on the right.

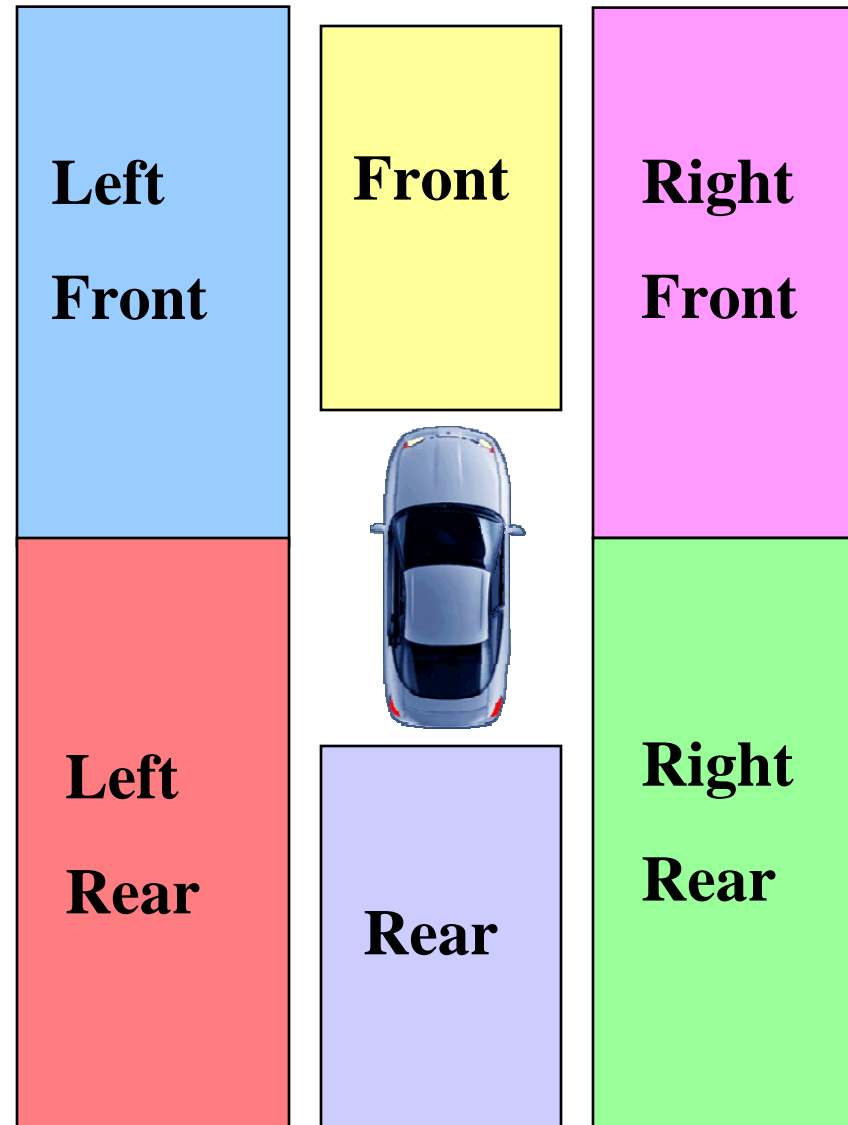
LANE POSITION 5

Straddling a line.

- Used to move away from a hazard on the left.



Six Zone Locations



Managing Time and Space Around Your Vehicle

THREE WAYS TO MANAGE SPACE TO THE FRONT

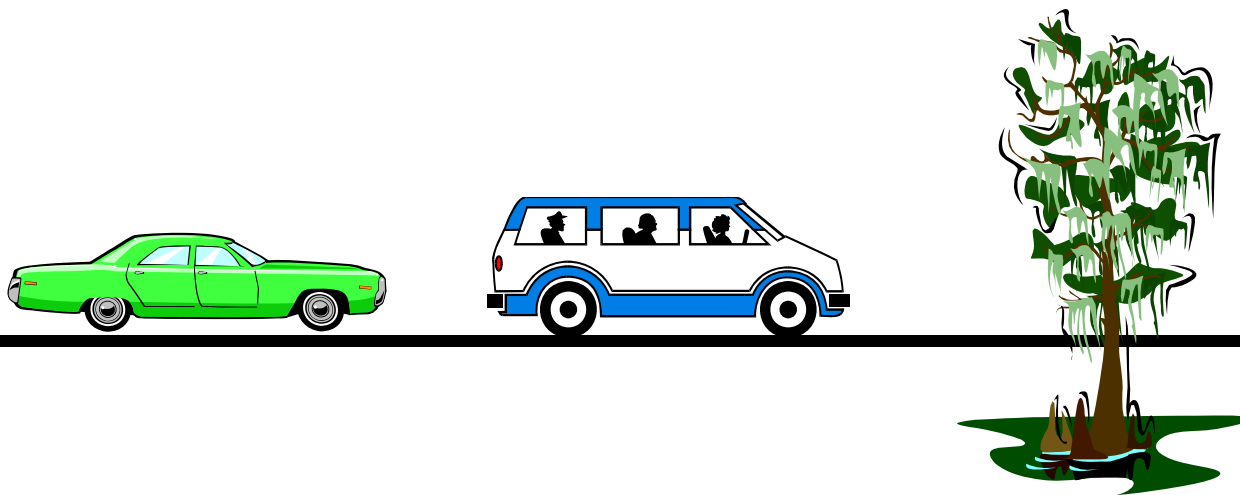
1. Adjust speed
2. When stopping – use precision vehicle placement
3. Control speed while in motion



Managing Time and Space Around Your Vehicle

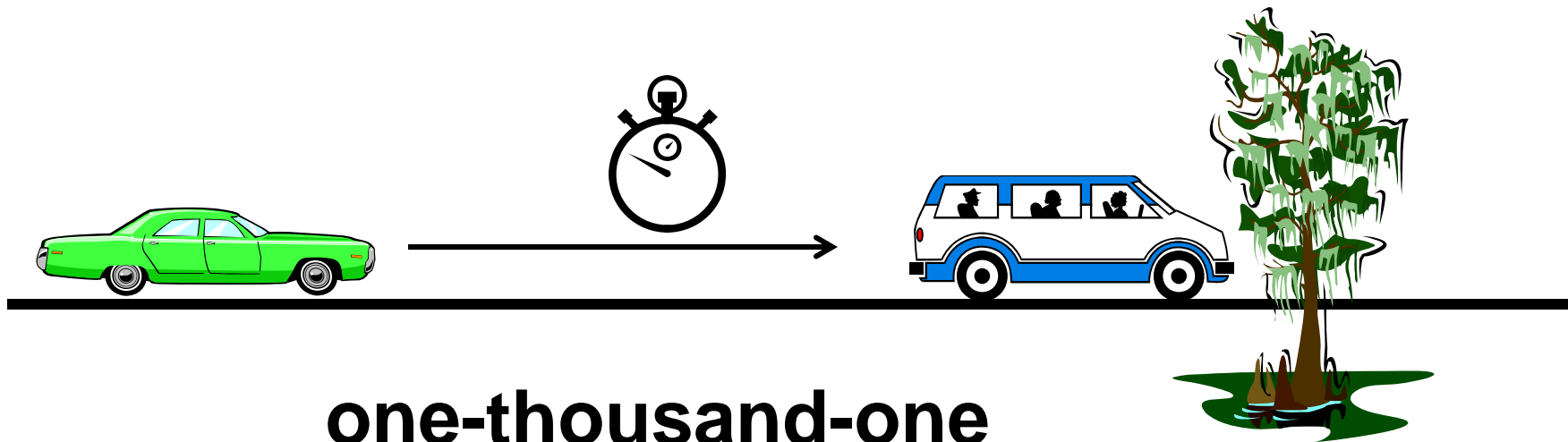
FOLLOWING DISTANCE

- Drivers have the most control over the space directly in front of the vehicle



Managing Time and Space Around Your Vehicle

ESTABLISH FOLLOWING DISTANCE



one-thousand-one
one-thousand-two
one-thousand-three
one-thousand-four



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Managing Time and Space Around Your Vehicle

ESTABLISH FOLLOWING DISTANCE



one-thousand-one
one-thousand-two
one-thousand-three
one-thousand-four



Managing Time and Space Around Your Vehicle

2-Second Following Distance

- Insufficient for today's traffic environment

3-Second Following Distance

- May be enough time to steer away from a problem on dry surfaces or brake at speeds up to 45 mph

4-Second Following Distance

- Provides time to steer out of a problem on dry surfaces and brake out of a problem at speeds up to 70 mph



Good Habits for Following Time and Space

Increase Following Distance When:

- Visibility is limited
- Traction is limited
- Increased visual and mental tasks are needed
- Being tailgated
- There is a line of sight or path of travel restriction
- Carrying a heavy load or pulling a trailer
- Learning to drive



Managing Time and Space Around Your Vehicle

Stop
where
you can
see the
tires of
the
vehicle in
front



Managing Time and Space Around Your Vehicle

When the light turns green, why delay moving into the intersections for two seconds?



Managing Time and Space Around Your Vehicle

Judging Gaps

The ability to judge a safe gap is necessary any time you join with traffic or pass through an intersection

- Why is a vehicle approaching from the left most hazardous?**
- Why is a larger gap needed to turn right than to cross an intersection?**
- Why is a left turn more dangerous than a right turn?**



Managing Time and Space Around Your Vehicle

Judging Gaps From a Stopped Position Traffic is moving at 30 mph

- **5-6 seconds** to cross a two lane roadway (vehicles need to be at least a block away)
- **7-8 seconds** to cross a four lane intersection
- **7-8 seconds** to turn left (vehicles need to be more than a block away)
- **6-7 seconds** to turn right (vehicles need to be at least a block away)
- **4-6 second** gap to change lanes
- **20-30 second** gap to make a 3-point turnabout



Managing Time and Space Around Your Vehicle

Control Space to the Rear

- Check rearview mirrors:
 - After seeing a zone change
 - Before and after braking
 - While stopped
 - Before and after making turns
 - Before and after a lane change
 - Check blind areas



Managing Time and Space Around Your Vehicle

Perception/Reaction/Response Time

Perception Time

Time it takes to
respond

Average
perception time is
 $\frac{3}{4}$ second

Reaction Time

Time it takes to
respond with
accelerator, brake,
or steering control

Average reaction
time is $\frac{3}{4}$ second

Response Time

Total time it takes
to complete the
action



Managing Time and Space Around Your Vehicle

Factors Affecting Response Time

- Distractions
- Inattention
- Poor Visibility
- Line of Sight Restrictions
- Fatigue
- Medications
- Alcohol
- Illness
- Age
- Talking on Cell Phone
- Others



Calculate Speed and Distance Traveled

Formula to calculate feet per second for each MPH of speed

- One mile = 5,280 feet
- One hour = 3,600 seconds
- 5,280 (one mile) divided by 3,600 (one hour) = 1.46666 feet per second

A vehicle will travel 1.467 feet per second for each mph of speed

$$40 \text{ mph} \times 1.467 = 59 \text{ feet per second}$$

$$60 \text{ mph} \times 1.467 = 88 \text{ feet per second}$$

$$80 \text{ mph} \times 1.467 = 117 \text{ feet per second}$$



Simplified Formula to calculate feet per second for each MPH of speed

Take the speed, divide by two, add the answer to the speed:

$$40 \text{ mph} \div 2 = 20 + 40 = 60 \text{ feet per second}$$

$$60 \text{ mph} \div 2 = 30 + 60 = 90 \text{ feet per second}$$

$$80 \text{ mph} \div 2 = 40 + 80 = 120 \text{ feet per second}$$

A football field is 300 feet in length. How long will it take a vehicle traveling 40 mph, 50 mph, and 60 mph to cover the length of the football field?



REDUCED RISK DECISION-MAKING

Three Precision Actions Available to Drivers

1. **Communicate**
2. **Change Speed**
3. **Change Direction**

